Final
Monitoring Workplan for the Assessment of Trash in San Diego County Watersheds

Prepared For:

The County of San Diego

August 30, 2007

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FINAL
Monitoring Workplan for the Assessment of Trash in San Diego County Watersheds

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1.0 INTRODUCTION

In accordance with the Receiving Waters and Urban Runoff Monitoring and Reporting Program No. R9-2007-0001 permit requirements (Permit), the San Diego Municipal Copermittees (Copermittees) are required to assess the presence of trash in receiving waters and urban runoff at each dry weather field screening site, mass loading station (MLS), and temporary watershed assessment station (TWAS) in the San Diego Watersheds. This trash assessment program is designed to provide information on the spatial extent and relative amount of trash present, as well at the nature of the trash present. Permit Section II A. 1. k. (Receiving Waters Monitoring Program) states: *"The Copermittees shall collaborate to develop and implement a program to assess the presence of trash (anthropogenic litter) in receiving waters. The program shall collect and evaluate trash data in conjunction with collection and evaluation of analytical data."* Additionally, Section II. B.3.c. (7) (Dry Weather field Screening and Analytical) requires the Copermittees to: *"Assess the presence of trash in receiving waters and urban runoff at each dry weather field screening or analytical monitoring station."*

1.1 Background

Trash is not only an aesthetic concern, but one which can adversely affect water quality, fish and wildlife, and the beneficial uses of water bodies. It can affect beneficial uses such as recreation in water bodies (fishing and swimming) and degrade aquatic habitat. Trash may become marine debris and has the potential to harm fish and wildlife as it travels through streams and rivers and reaches the ocean. Most water quality concerns from trash are related to wildlife in the form of entanglement and ingestion. In addition to wildlife, the human health effects from poor water quality are sometimes a result of discarded medical waste, human or pet waste, and broken glass. Trash "hotspots" such as illegal dumping, littering, and/or accumulation of trash are also of concern from a management perspective. Trash in the form of leaf litter or other organic materials (such as from intentional dumping) can be of concern and cause nutrient and ecosystem imbalance in streams and rivers. During storms, trash may block drainage areas and result in flooding that erodes soils by undercutting stream banks. Excess suspended solids (including trash) are detrimental to aquatic organisms and may scour stream beds and damage habitats.

The San Francisco Bay Region implemented a rapid trash assessment from 2002 through 2005 in order to support Clean Water Act Section 303(d) listing decisions and, in conjunction with the SWAMP program, produced a document called "A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams." The Trash Assessment Program for San Diego Watersheds will parallel the approach outlined in this document. Other work in the San Diego area has been conducted by the City of San Diego Storm Water Division, which currently assesses trash at various locations in Chollas Creek. The monitoring is done once a year at dry weather sites and employs a simplified version of the ranking system developed by the San Francisco Bay Region. A similar assessment is being conducted in Forrester Creek by the City of El Cajon. In an attempt to expand upon these studies and accurately represent the range of conditions found in San Diego Watersheds, the Dry-Weather Monitoring Sub-Workgroup has developed a trash assessment form (Attachment 1) which provides five categories to describe the abundance of trash.

1.2 Monitoring Objectives and Assessment Questions

The overall monitoring objective is to assess the relative amounts of trash within the San Diego Watersheds. Until now, the nature of trash within most watersheds has been unknown and, although problem areas have been identified, it is unclear how much trash can be attributed to urban runoff. The primary objective of this program is to develop a qualitative assessment of trash in San Diego Watersheds by providing information on the spatial extent and relative amount of trash present, as well as the nature of the types of trash present. This program will also evaluate the spatial and temporal variability in trash distribution and assist the Copermittees in setting watershed priorities.

Section II.A.9 of the Permit Fact Sheet states that *"Since a monitoring program for trash is new, the Copermittees are provided significant leeway in the development and implementation of the program. The Copermittees can utilize the flexibility incorporated into the MRP (Monitoring and Reporting Program) to develop a program that is workable for them while providing the necessary information."*

In order to assess the presence of trash for use in this program, the following questions are asked:

Q1. Where is trash being detected in San Diego Watersheds?

By performing trash assessments at each of the MLS and TWAS during wet and dry weather events and at the dry weather monitoring locations during dry events using a standardized trash monitoring form (Attachment 1), the Copermittees will assess approximately 1,000 sites per year, which will determine where trash is being detected. This spatial information on trash will assist the Copermittees with identifying problem areas that will in turn be considered to develop regional and watershed priorities.

Q2. How many sites are identified as submarginal or poor?

At sites identified as submarginal or poor, the spatial extent, relative amounts, and nature of trash present will also be evaluated through the use of the standardized trash monitoring form mentioned in Q1 above (Attachment 1). These results will help the Copermittees identify the nature of problem areas and aid Copermittees in prioritizing sites. Sites can also be reviewed over time to evaluate any trends (positive or negative) on a jurisdictional, watershed and regional level. Sites will be assessed during the initial monitoring period (i.e. first reporting cycle). Recommendations for program refinements will be made based on the data gathered over the first year of program implementation. An overall evaluation of trash levels and potential sources within individual watersheds will be conducted as part of the Annual Regional Monitoring Report.

Q3. In locations identified as submarginal or poor, what is the nature of the types of trash present?

The nature of the types of trash identified at submarginal, and poor sites will help the Copermittees determine the potential sources and routes of trash which can then guide management actions. The potential implementation of management actions such as outreach

efforts to specific groups may be directed based on the information collected on the nature of trash.

2.0 MONITORING DESIGN

2.1 Trash Assessment

2.1.1 Locations

Trash assessments will be performed as part of the Regional Monitoring Program on a rotational basis during wet and dry weather monitoring at the locations discussed below.

Mass Loading Stations (MLS) and Temporary Watershed Assessment Locations (TWAS)
Trash assessment will be performed at MLS and TWAS monitoring sites during both dry ambient monitoring and storm event monitoring. These sites will provide information on the relative amounts of trash present in receiving waters. The minimum number of annual monitoring events required for each location is provided in Table 1. This schedule corresponds to that specifically outlined in the Permit.

Table 1. Trash Monitoring Locations and Number of Annual Monitoring Events.

Watershed	Permit Year 2007-2008		Permit Year 2008-2009*		Permit Year 2009-2010		Permit Year 2010-2011		Permit Year 2011-2012	
	MLS	TWAS	MLS	TWAS	MLS	TWAS	MLS	TWAS**	MLS	TWAS**
Santa Margarita River	4		1				4			
San Luis Rey River	4	4	1				4	4		
Loma Alta Creek		4						4		
Buena Vista Creek		4						4		
Agua Hedionda Creek	4	4	1				4	4		
Escondido Creek	4	4	1				4	4		
San Dieguito River	4	8	1				4	8		
Los Peñasquitos Creek	4	8	1				4	8		
Rose Creek						4				4
Tecolote Creek			1		4	4			4	4
San Diego River			1		4	12			4	12
Chollas Creek	4		1		4		4		4	
Sweetwater River			1		4	4			4	4
Otay River						4				4
Tijuana River			1		4	8			4	8

*Bight '08 Monitoring Year
** TWAS Locations may change based on information gathered during the first rotation

Dry Weather Monitoring Stations

Trash assessment will be conducted at established dry weather field screening locations. Stations within each Copermittee's jurisdiction will be identified in the Jurisdictional Urban Runoff Management Plans to be submitted in January 2008.

2.1.2 Frequency

The Trash Assessment Form will be completed at each location during each monitoring event. MLS and TWAS locations will be monitored on a rotational basis between the northern and southern watersheds during two wet weather and two dry weather (ambient) monitoring events per year. Each of the selected dry weather monitoring locations will be assessed for trash at least once between May 1st and September 30th of each year (or as often as the Copermittees determine is necessary to comply with permit requirements).

2.1.3 Trash Assessment Procedures

Prior to a site visit, it is important to identify personnel who are familiar with the site and have some local knowledge of the general area. There should also be a general consensus among the monitoring team as to the extent of the area to be assessed. When a site is first established, the length of the site being assessed should be determined as a channel or shore length. When possible, distinctive site characteristics, such as a large boulder or tree, should be used as starting/finishing length landmarks. The upper boundary of each bank should be used for the width of the monitoring site. This can be determined visibly by either a debris or water line. When determining site boundaries, it is important to remember that the intent of the trash assessment is to determine the trash which has been mobilized or has the potential to be mobilized by water at the defined locations.

Upon arrival at a designated site, a qualitative estimate of the presence of trash should be determined and documented in the top portion of the Trash Assessment Form (Attachment 1). This is a qualitative assessment which should reflect a first impression of the site. There are five categories to describe the amount and extent of trash at each site:

- *Optimal:* On first glance, no trash is visible. Little or no trash (<10 pieces) is evident when the evaluated area is closely examined for litter and debris.
- *Suboptimal:* On first glance, little or no trash is visible. After close inspection, small levels of trash (~10-50 pieces) are evident in the evaluated area.
- *Marginal:* Trash is evident in low to medium levels (~51-100 pieces) on first glance. Evaluated area contains litter and debris. Evidence of site being used by people: scattered cans, bottles, food wrappers, blankets, or clothing are present.
- *Submarginal:* Trash distracts the eye on first glance. Evaluated area contains substantial levels of litter and debris (>100-400 pieces). Evidence of site being used frequently by people: many cans, bottles, food wrappers, blankets, or clothing are present.
- *Poor:* Site is significantly impacted by trash. Evidence of trash accumulation behind a constriction point or evidence of excessive dumping. Evaluated area contains substantial levels of litter and debris (>400 pieces).

Sites will also be evaluated to determine the threat to human health and/or threat to aquatic health. In some cases, sites may pose a threat to both categories. The evaluation of each category is presented as follows:

- Threat to Human Health - Site poses a threat to human health via swimming, wading, or walking through the area. Trash and debris has the potential to contain chemicals that may bioaccumulate, transmit dangerous bacteria (e.g. medical waste, diapers, human waste), or has the potential for physical harm (sharps, entanglement, nails, etc…). Comments should be added at the bottom of the field sheet for clarification.

- Threat to Aquatic Health – Site poses a threat to aquatic health or other wildlife (via contact, ingestion, entanglement, etc...) from the trash and debris present. Trash and debris such as small floatable material that is persistent and can be transported long distances may resemble food and may be ingested. Wire, plastic, fishing line, and other material that has the potential for entanglement. Oil and other visible chemicals or chemical containers falls in this category. Comments should be added at the bottom of the field sheet for clarification.

If the quantity of trash falls into the submarginal, or poor category, assessments of the type(s) of trash present, the potential trash mobilization route, and the potential source will occur. Categories of trash types listed on the form include:

- Automotive
- Biohazard waste
- Business Related
- Cigarette Butts
- Construction
- Fabric/Clothing
- Food Packaging
- Food Waste
- Household
- Shopping Carts
- Toxic
- Yard Waste

The types of trash present should be ranked in order of their prevalence (from 1 to 12, where 1 is the most prevalent and 12 is the least prevalent). Next, the user should try to determine the potential mobilization route for the trash (e.g., dumping, littering, or upstream sources). If the route is unknown, then it may be described as "unable to determine." Finally, the user should check the potential sources of the trash. The form includes the following source categories:

- Household
- Construction
- Commercial
- Industrial
- School
- Transient

Again, if the source is unknown, the form includes the category "unable to determine." Prior knowledge of the surrounding area will help when making assumptions about the potential route and sources of trash present.

3.0 ASSESSMENT AND REPORTING

3.1 Trash Assessment

The regional and jurisdictional trash assessments provide Copermittees with valuable information they can use to make informed decisions on how to address problem areas. Information such as potential sources and/or types of trash may guide the Copermittees efforts on outreach to the appropriate target groups. This information may also be used to guide the selection of management actions where appropriate. In order to evaluate the nature and extent of trash accumulation, the following questions are asked as the basis for the monitoring design:

Q1. Where is trash being detected in San Diego Watersheds?

The presence of trash in receiving waters and MS4 locations will be differentiated and illustrated in tabular and graphical formats. GIS maps may also be used, when applicable, to depict the relative amounts of trash at the MLS, TWAS and dry weather monitoring locations across San Diego County.

Q2. How many sites are identified as submarginal or poor?

Summarizing information on how many sites with submarginal, or poor trash levels can provide a general overview of where problem areas occur throughout the region. The number of problem sites can be tracked annually and evaluated over time. This type of assessment can be conducted on both a regional and watershed scale, as well as jurisdictionally in the Dry Weather Monitoring reports. General information on the number of submarginal, or poor sites per watershed will be presented in tabular and graphical formats in regional and watershed assessments. Jurisdictional assessments could also track problem sites over time to determine if management efforts are working. Evaluating the effectiveness of outcomes such as behavior changes and load reductions, where applicable, may be appropriate after evaluating multiple years of data and observing improvements or declines in site conditions.

Q3. In locations identified as submarginal, or poor, what is the nature of the types of trash present?

In locations where submarginal, or poor trash levels are present, additional analysis of the nature of trash present will be performed. These analyses may differentiate between dry and wet weather monitoring events, as well as between receiving waters and MS4 monitoring locations. During the first year assessment period, general information on the number of submarginal, or poor sites per watershed along with the predominant trash types and potential sources will be presented in tabular and graphical formats in regional and watershed assessments. Additionally, the number of sites determined to be threats to human and/or aquatic health will be presented in tabular format. The information assessed may then be used to identify regional strategies to develop targeted outreach strategies, where applicable. When appropriate, these data could be

used by watershed groups and/or jurisdictions to single out a predominant source and/or type of trash that commonly occurs. The data may also help guide the selection of management actions where appropriate.

3.2 Reporting

Trash assessment reporting will be presented on a jurisdictional basis in the Jurisdictional Urban Runoff Monitoring Program (JURMP) Reports and on a watershed basis in the Annual Regional Monitoring Report. The Annual Regional Monitoring Report will include summary statistics of trash assessment data within each watershed management area assessment section. Copermittees will also provide jurisdictional trash assessments in their individual dry weather reports contained in their JURMPs. These assessments will follow the Permit requirements for reporting the dry weather monitoring program. Trash monitoring data from jurisdictional dry weather monitoring and MLS/TWAS monitoring will be assessed by modifying the current Watershed Data Assessment Framework used for establishing frequency of occurrence for water quality parameters. This assessment will provide the Copermittees with information needed to make informed decisions on where to address problem areas related to trash. The diamond ranking system for determining constituent of concern (COC) frequency of occurrence rankings of "high", "medium", or "low" will be used to assess the watersheds trash data. These criteria will take into account the dry weather monitoring and MLS/TWAS sites with submarginal, or poor assessments only; and classify each COC as high, medium or low frequency of occurrence in the watershed. The classification of COC can change from year to year in response to the changes in the levels of trash being identified within the watershed.

4.0 Program Review and Modification

As stated previously in this document, Order 2007-0001 provides the Copermittees flexibility to develop a workable trash assessment program. Specifically, section II.A.9 of the Permit Fact Sheet states:

"Since a monitoring program for trash is new, the Copermittees are provided significant leeway in the development and implementation of the program. The Copermittees can utilize the flexibility incorporated into the MRP (Monitoring and Reporting Program) to develop a program that is workable for them while providing the necessary information."

The program described in this document meets the Permit criteria for a trash monitoring program. As stated previously in this program, the initial year of trash monitoring focuses on qualitative assessments of trash at sites within the region. This was determined to be the most acceptable approach because it enables Copermittees to collect a relatively consistent set of data, while making initial assessments of the overall impacts of trash within the region. To date, Copermittees cannot be certain that a high number of sites are impacted with trash. More importantly, Copermittees need to ensure that the data they collect can be directly related to making management decisions (ie site cleanups, increased BMPs, etc) and to water quality improvements.

Because the program is newly developed and has not yet been field tested, it is appropriate to assume that modifications may need to be made after an initial assessment of the data collected.

Copermittees intend to evaluate the data and determine where and how program modification will be made. Particularly important will be data collected from sub-marginal and poor sites. Where initial data suggests that the incorporation of quantitative assessments will lead to improvements in water quality, then Copermittees will modify the program to include quantitative measures.

5.0 REFERENCES

California Regional Water Quality Control Board, San Diego Region. 1994. *Water Quality Control Plan for the San Diego Basin (9).*

California Regional Water Quality Control Board, San Francisco Region. 2007. *A Rapid Trash Assessment Method Applied to Waters of the San Francisco Bay Region: Trash Measurement in Streams.*

ATTACHMENT 1: TRASH ASSESSMENT FORM

Draft Trash Assessment Form

SITE ID: _____ **DATE:** _____

LOCATION: _____ **TIME:** _____

OBSERVER: _____

PREVIOUS TRASH ASSESSMENT RATING (IF APPLICABLE):

ESTIMATED AREA OF ASSESSMENT L X W (FT):

Amount and Extent of Trash	
EVALUATION OF TRASH INCLUDES*: ☐ **MS4** ☐ **RECEIVING WATER** ☐ **BOTH**	
☐ **Optimal**	On first glance, no trash visible. Little or no trash (<10 pieces) evident when evaluated area is closely examined for litter and debris.
☐ **Suboptimal**	On first glance, little or no trash visible. After close inspection small levels of trash (~10-50 pieces) evident in evaluated area.
☐ **Marginal**	Trash is evident in low to medium levels (~51-100 pieces) on first glance. Evaluated area contains litter and debris. Evidence of site being used by people: scattered cans, bottles, food wrappers, blankets, or clothing present.
☐ **Submarginal**	Trash distracts the eye on first glance. Evaluated area contains substantial levels of litter and debris (>100- 400) . Evidence of site being used frequently by people: many cans, bottles, food wrappers, blankets, or clothing present.
☐ **Poor**	Site is significantly impacted by trash. Evidence of trash accumulation behind a constriction point or evidence of excessive dumping. Evaluated area contains substantial levels of litter and debris (>400 pieces).

* In areas where receiving water is accessible and adjacent to dry weather site, trash evaluation must include receiving water.

Site Evaluation for Threat to Human Health and/or Aquatic Health	
☐ **Threat Human Health**	Site poses a threat to human health via swimming, wading, or walking through the area. Trash and debris has the potential to contain chemicals that may bioaccumulate, transmit dangerous bacteria (e.g. medical waste, diapers, human waste), or has the potential for physical harm (sharps, entanglement, nails, etc…). Comments should be added for clarification .
☐ **Threat to Aquatic Health**	Site poses a threat to aquatic health or other wildlife (via contact, ingestion, entanglement, etc...) from the trash and debris present. Trash and debris such as small floatable material that is persistent and can be transported long distances may resemble food and may be ingested. Wire, plastic, fishing line, and other material that has the potential for entanglement. Oil and other visible chemicals or chemical containers falls in this category. Comments should be added for clarification.

- **Complete the following section for Marginal, Submarginal, and Poor Evaluations ONLY**

TYPE	Ranking or Count by Type *	POTENTIAL ROUTE (CHECK UP TO 2)				POTENTIAL SOURCE (CHECK UP TO 2)						
		Dumping	Littering	Upstream	Unable to determine	Household	Construction	Commercial	Industrial	School	Transient	Unable to determine
Automotive												
Biohazard Waste												
Business Related												
Cigarette Butts												
Construction												
Fabric/Clothing												
Food Packaging												
Food Waste												
Household												
Shopping Carts												
Toxic												
Yard Waste												

* Only rank the types of trash PRESENT in evaluated area from 1 through 12 (1 is most prevalent – 12 is least prevalent). DO NOT rank types of trash that are not present in evaluated area.

Comments:_____

_____

_____

_____

_____

_____

_____

_____

Note: This draft form may be updated by the Dry Weather Monitoring Workgroup